CLAIMS

WE CLAIM:

1. An optical receiver, comprising :

an optical pre-amplifier for receiving an input light signal, the optical pre-amplifier employing no carrier filters in the optical pre-amplifier;

a PIN diode, coupled to the optical pre-amplifier, for converting the input light signal into an electrical current signal;

a transimpedance amplifier, coupled to the photodiode, for converting the electrical current signal to an output electrical voltage signal; and

a control loop, coupled to the transimpedance amplifier, for adjusting the optical signal generated by the pre-amplifier relative to the output electrical voltage signal generated by the transimpedance amplifier.

2. The optical receiver of Claim 1, wherein the optical pre-amplifier comprises:

a first isolator having an input and an output;

a second isolator having an input and an output;

a pump laser an input and an output; and

an optical multiplexer (mux) having an input coupled to the output of the pump laser and an output, wherein the output of the optical multiplexer is coupled between the output of the first isolator and the input of the second isolator, the first and second isolators being used in order reject pump power generated by the pump laser and avoid optical reflection in the amplifier mean .

3. The optical receiver of Claim 2 in backward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the east end of the erbium fiber coupled to the output of the optical multiplexer and the input of the second isolator, the input light signal generating an input light power that propagates in contrary direction relative to a pump light power from the pump laser.

4. The optical receiver of Claim 2 in forward pumping mode, wherein the optical pre-amplifier comprises an erbium fiber having a west end and east end, the west end of the erbium fiber coupled to the output of the optical multiplexer and the output of the first isolator, the input light signal generating an input light power that propagates in same direction relative to a pump light power from the pump laser.

5. The optical receiver of Claim 3, wherein the control loop comprises a level detector for generating a level signal relative to the peak or average value of the output electrical voltage signal.

6. The optical receiver of Claim 5, wherein the control loop comprises an automatic gain controller for generating a control voltage signal for controlling the level of optical amplification generated by adjusting the current of a pump laser in the optical pre-amplifier.

7. The optical receiver of Claim 6, further comprising a clock/data regenerator coupled to the transimpedance amplifier for compensating distortion and timing jitter to ensure accurate regeneration of the output electrical voltage signal.

8. A method for maintaining the intensity of an optical signal, comprising:

(a) receiving an input light signal;

(b) amplifying the input light signal to produce an output electrical voltage signal without carrier filtering; and

(c) feeding the output electrical voltage signal back for ~~adjusting~~ maintain the PIN input light signal constant by correlating the output

electrical voltage signal to the intensity of the input light signal by adjusting the gain of the pre-amplifier.

9. The method of Claim 8, wherein the feeding step, comprises generating a level signal output relative to the peak or average value of the output electrical voltage signal.

10.The method of Claim 9, wherein the feeding step, comprises generating a control voltage signal for controlling the level of input light signal generated by controlling the current of a pump laser.

11.A transponder, comprising:

a controller;

a transmitter, coupled to the controller transmitter; and

a receiver, coupled to controller, the receiver having an optical amplifier receiver comprising:

an optical pre-amplifier for receiving an input light signal, the optical pre-amplifier employing no filters in the optical pre-amplifier;

a photodiode, coupled to the optical pre-amplifier, for converting the input light signal into an electrical current signal;

a transimpedance amplifier, coupled to the photodiode, for converting the electrical current signal to an output electrical voltage signal; and

a control loop, coupled to the transimpedance amplifier, for adjusting the optical signal generated by the pre-amplifier relative to the electrical voltage signal generated by the transimpedance amplifier.

12.The optical receiver of Claim 11, wherein the control loop comprises a level detector for generating a level signal relative to the peak or average value of the output electrical voltage signal.

13. The optical receiver of Claim 12, wherein the control loop comprises an automatic gain controller for generating a control voltage signal for controlling the level of optical amplification generated by adjusting the current of a pump laser in the optical pre-amplifier.

14.The optical receiver of Claim 13, further comprising a clock/data regenerator coupled to the transimpedance amplifier.

15.The optical receiver of Claim 13, wherein the transmitter comprises:

an electronic multiplexer having inputs for receiving a plurality of inputs and generating a multiplexed output signal;

a driver, coupled to the electronic multiplexer, for driving the multiplexed output signal from the electronic multiplexer and generating a driver output signal; and

a modulator, coupled to the driver, for modulating the input light of the modulator.

16.The optical receiver of Claim 13, further comprising a demultiplexer coupled to the optical amplifier PIN receiver.

17.The optical receiver of Claim 13, further comprising a coupler and a power detector coupled to the input of the optical PIN receiver.